

REMARKS

In the Office Action dated September 8, 2009, the Examiner rejects claim 16 under 35 U.S.C. §102(b) as being anticipated by Kazuo (JP'738); rejects claims 1, 5-7, and 10 under 35 U.S.C. §103(a) as being unpatentable over JP'738 in view of Motoshige (JP'817); and rejects claims 8, 9, 12, 14 and 15 as being unpatentable over JP'738 in view of Saburo (JP'517).

In response, Applicants amend claims 1 and 10. Claims 2-4, 11 and 13 were previously canceled. No new claim is added. Applicants respectfully request reconsideration of the application as amended.

Applicants submit that this Amendment is suitable for entry after a final rejection because it adds no new claims, places the claims in better form for appeal, and only makes non-substantive amendments. Applicants submit that the amendments require no additional consideration because they merely clarify language previously recited in the claim.

Applicants traverse the rejection of claim 16 under 35 U.S.C. §102(b) as being anticipated by JP'738. Claim 16 describes applying oscillations to the cooling liquid with an oscillation device horizontally and reciprocally moving in the cooling liquid and changing the pressure applied to the liquid level of the cooling liquid.

JP'738 does not disclose an oscillation device horizontally and reciprocally moving in a cooling liquid. The Examiner states that JP'738 discloses that the position between the oscillating generating means and the work piece is adjustable in order to remove vapor film efficiently, and the rejection further asserts that the position between the oscillating generating means and the work piece being adjustable discloses an oscillation device horizontally and reciprocally moving in the cooling liquid. (P. 3 of the Action.) The Examiner is asked to explain how adjusting the oscillating generating means in relation to the work piece equates to an oscillation device that moves both horizontally and reciprocally in the cooling liquid. The two do not address the same issue. JP'738 states in paragraphs [0018] that the vibrating motor 8 of the oscillating generating means 7 moves generates only oscillation of the vertical direction. As discussed in paragraph [0019], the motor 8 is fixed to a installation base 9 that is movable only in the vertical direction. The oscillating shaft 13 which has the two wings is attached to the base. Therefore, the base moves the entire oscillating means up or down to position the means in relation to the liquid level. This is not

relevant to an oscillation device moving horizontally and reciprocally in the cooling liquid after it is positioned. JP'738 further supports this interpretation in paragraph [0022], stating that the vibrating motor 8 will vibrate up and down. Then the oscillating shaft also vibrates up and down, with each wing vibrating up and down. There is no disclosure of the oscillating means moving horizontally and reciprocally in the cooling liquid

Applicants submit that claim 16 is allowable over the prior art. Notice of allowance is requested.

Claims 1, 5-7, and 10 are rejected under 35 U.S.C. §103(a) as being unpatentable over JP'738 in view of Motoshige (JP'817). Claim 1 (and claims 5-7 by their dependency) and claim 10 recite at least in part a cooling method comprising breaking a vapor film which is formed when the cooling liquid vaporizes on a surface of the metal part. The step of breaking the vapor film occurs by applying a pressure to the vapor film, the pressure being repeatedly varied, by the step of one of 1) applying oscillations to the cooling liquid with an oscillation device horizontally and reciprocally moving in the cooling liquid and a stirrer separately arranged in the cooling liquid, 2) changing a pressure applied to a liquid surface level of the cooling liquid by introducing a gas above the liquid surface level via a gas introduction pipe, and 3) combining applying the oscillations to the cooling liquid with the oscillation device horizontally and reciprocally moving in the cooling liquid and changing the pressure applied to the liquid surface level of the cooling liquid by introducing the gas above the liquid surface level via the gas introduction pipe.

The amendments to claims 1 and 10 clarify that the step of breaking the vapor film occurs by applying a pressure to the vapor film, the pressure being repeatedly varied, rather than stating "so that the pressure repeatedly varies."

As argued above, JP'738 does not disclose the use of an oscillation device horizontally and reciprocally moving in the liquid. The argument above is incorporated herein. As noted by the Examiner on page 5 of the Office Action, JP'738 also does not disclose introducing a gas above the liquid surface level. Applicants also submit that JP'738 does not disclose that breaking the vapor film occurs by applying a pressure to the vapor film that is repeatedly varied. JP'738 discloses removing the vapor film with waves by moving blades up and down. This is described in Applicant's application on page 2 of the background. When a metal part such as the wings of JP'738 stir the liquid when the vapor

film is broken, strong flows are generated in the liquid and uniform breakage of the film is hindered. Applicant's device, as required by the claims, removes the vapor film by varying the pressure applied to the film. The vapor film is repeatedly subject to expansion and contraction and fluctuates as the changing pressure is applied to the film. Such fluctuations reduce the thickness of the vapor film, so the vapor film is broken at the origin of the thinned part. This produces weak currents like natural convection rather than one current based on the size of the wave. This is described in the specification on page 3. This method of removing the film by varying the pressure is not disclosed in JP'738.

For the combination of JP'738 and JP'817 to render the claims obvious, JP'817 must cure the deficiencies of JP'738. However, JP'817 does not disclose both the use of an oscillation device horizontally and reciprocally moving in the liquid and breaking the vapor film occurs by applying a pressure to the vapor film that is repeatedly varied. In addition, Applicant submits that JP'817 also does not disclose breaking the vapor film by applying a pressure to the vapor film, the pressure being repeatedly varied, by introducing a gas above the liquid surface level to repeatedly change a pressure to be applied to a liquid surface level of the cooling liquid.

As noted above, Applicant's device, as required by the claims, removes the vapor film by varying the pressure applied to the film. One way this is achieved is by varying the pressure of a gas to the liquid surface. JP'817 discloses controlling the gas pressure above the liquid level to control the cooling rate of the work piece. JP'817 uses cooling curves by which to maintain the correct pressure to control cooling. See paragraph [0008]. There is a pressure sensor to detect the atmospheric pressure in the space above the liquid. ¶[0013]. The flow and pressure requirement for obtaining the cooling curve which fulfills demand quality is inputted. ¶[0013]. Inside a predetermined pressure and predetermined time maintenance is carried out by to achieve the appropriate cooling curve. ¶[0014]. Fine adjustment of internal pressure can be attained. ¶[0016]. JP'817 does not discuss removing a vapor film by breaking the vapor film at all, much less with varying gas pressures. The Examiner states on page 6 of the Office Action that it would be obvious to one skilled in the art to apply gas above the liquid surface as demonstrated by JP-817 in the process of JP'738 in order to control the atmosphere pressure in the chamber. However, this is not necessary or desirable to Applicant. Applicant uses the gas pressure to break the vapor film. Controlling the atmospheric pressure in the chamber is not relevant to Applicant's invention. Rather, as

invention. Rather, as stated on page 18 of the specification, the pressure on the liquid is varied by repeatedly performing the opening and closing of the solenoid valve 6a of the gas exhaust pipe. In addition, the controller changes the gas volume introduced depending on the condition of the vapor film. (Pg. 18)

The combination of JP'738 and JP'817 does not teach, suggest or render obvious 1) the use of an oscillation device horizontally and reciprocally moving in the liquid, 2) breaking the vapor film by applying a pressure to the vapor film that is repeatedly varied, and 3) breaking the vapor film by applying a pressure to the vapor film, the pressure being repeatedly varied, by introducing a gas above the liquid surface level to repeatedly change a pressure to be applied to a liquid surface level of the cooling liquid. Accordingly, the cited combination does not render claims 1, 5-7 and 10 unpatentable. Applicants submit that claims 1, 5-7 and 10 are in condition for allowance, notice of which is requested.

Claims 8, 9, 12, 14 and 15 are rejected as being unpatentable over JP'738 in view of Saburo (JP'517). Claims 8, 9, 12, 14 and 15 depend from either claim 1 or claim 10 to include all of the limitations therein. As argued above, JP'738 does not disclose 1) the use of an oscillation device horizontally and reciprocally moving in the liquid, 2) breaking the vapor film by applying a pressure to the vapor film that is repeatedly varied, and 3) breaking the vapor film by applying a pressure to the vapor film, the pressure being repeatedly varied, by introducing a gas above the liquid surface level to repeatedly change a pressure to be applied to a liquid surface level of the cooling liquid, all of which are recited in claims 1 and 10. Therefore, JP'517 would need to cure the deficiencies of JP'738 for the independent claims before even considering the dependent claims. However, JP'517 does not disclose any of the three elements missing from JP'738. Therefore, the combination fails to teach, suggest or render obvious claims 1 and 10 and any claim depending from them.

Accordingly, claims 8, 9, 12, 14 and 15 are in condition for allowance, notice of which is requested.

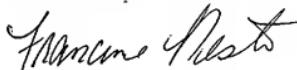
It is respectfully submitted that this Amendment traverses and overcomes all of the Examiner's rejections to the application as originally filed. It is further submitted that this Amendment has antecedent basis in the application as originally filed, including the specification, claims, and drawings, and that this Amendment does not add any new subject

matter to the application. Reconsideration of the application as amended is requested. It is respectfully submitted that this Amendment places the application in suitable condition for allowance; notice of which is requested.

If the Examiner feels that prosecution of the present application can be expedited by way of an Examiner's amendment, the Examiner is invited to contact the Applicant's attorney at the telephone number listed below.

Respectfully submitted,

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